

Math 7

Course Description

Math 7 is provided as an intervention for students requiring additional experience in developing conceptual understanding and building mathematical skills. Math 7 meets the needs of those students who are not ready to move on to Pre-Algebra by focusing on computation and estimation with rational numbers, introduction to proportional reasoning, and linear relationships. Students in Math 7 will review and extend knowledge obtained in sixth grade mathematics by conjecturing, verifying, thinking critically, and applying mathematical concepts. While mathematics skills will be strengthened, teaching will develop understanding of concepts in depth and enable students to make meaningful connections to life.

Math 7

Standard 1: The students will acquire number sense and perform operations with rational and real numbers.

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| <p>Objective 1.1: Compute fluently and make reasonable estimates.</p> <ul style="list-style-type: none"> a. Compute fluently with integers, positive decimals, fractions, and percents. b. Determine the reasonableness of a solution to a problem after computing its value. | <p>Objective 1.2: Represent whole numbers, fractions (rational numbers), and decimals in a variety of ways.</p> <ul style="list-style-type: none"> a. Represent numbers using standard form, exponential, scientific, and calculator notation. b. Recognize that any number, except zero, raised to the zero power is one, e.g., $14^0=1$. | <p>Objective 1.3: Identify relationships among whole numbers, fractions (rational numbers), and decimals.</p> <ul style="list-style-type: none"> a. Compare and order whole numbers, fractions (rational numbers), and decimals, and find their approximate locations on a number line. b. Predict the outcome of operating among fractions, decimals, percents, and integers, e.g., when multiplying a positive number by a number between 0 and 1, the result is a smaller number. c. Recognize and use the multiplicative property of zero, e.g., if $a \text{ times } b = 0$, then $a = 0$, $b = 0$, or a and $b = 0$. d. Multiply algebraic expressions using the distribution of multiplication over addition or subtraction and demonstrate these properties using a variety of manipulatives and symbolic representations. e. Add or multiply numbers in a convenient order by using the Commutative and Associative Properties of Addition or Multiplication. f. Recognize and use the additive and multiplicative identities, e.g., $5 + 0 = 5$ and $1 \times \frac{2}{3} = \frac{2}{3}$. g. Recognize and use the additive inverse, e.g., $8 + (-8) = 0$. h. Recognize and use the multiplicative inverses, e.g., $\frac{4}{5} \times \frac{5}{4} = 1$. i. Recognize that division by zero is not defined, e.g., $6/0 = \text{undefined}$. |
| <p>Objective 1.4: Solve problems involving rational numbers using addition, subtraction, multiplication, and division.</p> <ul style="list-style-type: none"> a. Solve problems involving rational numbers using factors, multiples, prime factorization, relatively prime numbers, and common divisibility rules. b. Simplify computations using the inverse operations of addition and subtraction, multiplication and division, and squaring and finding square roots of perfect squares. c. Calculate the base, rate or percentage using percents, including those greater than 100% and those less than 1%. d. Simplify expressions using order of operations. | | |

| Standard 2: Students will use patterns, relations, and functions to represent and analyze mathematical situations using algebraic symbols. | | |
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| Objective 2.1: Understand patterns, relations, and functions. a. Describe a pattern using a mathematical rule or algebraic expression. b. Create simple numerical and visual patterns. c. Extend simple numerical and visual patterns. | Objective 2.2: Represent, solve, and analyze mathematical situations using algebraic symbols. a. Write a variable expression to identify pattern relationships, e.g., triangular numbers. b. Translate verbal expressions into symbolic representations, e.g., "increase by three" translates to $+ 3$. c. Translate numerical representations into verbal expressions, e.g., $5 - 3$ translates to "five subtract three." d. Verify that performing the same operation to both sides of an equation will produce an equivalent equation, e.g., $a + 2 = 4$ is the same as $a = 2$ if 2 is subtracted from both sides of the equation. e. Evaluate algebraic expressions, e.g., when $b = 3$, what is the value of $3(b - 4) + 2b$? f. Solve two-step single variable equations. g. Solve two-step single variable inequalities including those of the following form: $-4x < 6$. h. Use proportional reasoning to solve problems. | Objective 2.3: Represent quantitative relationships using mathematical models and symbols. a. Model and solve real-world problems using various representations, such as graphs, tables, manipulatives, and pictures. b. Identify information in a problem as needed or not needed. c. Use graphs and tables to identify and describe changes in related quantities. |
| Standard 3: Students will use spatial and logical reasoning to recognize, describe, and identify geometric shapes and principles. | | |
| Objective 3.1: Describe, identify, and analyze characteristics and properties of geometric shapes. a. Classify common two- and three-dimensional objects using information about the sides and angles. b. Identify similar and congruent figures. c. Identify relationships among angles, side lengths, and perimeters of similar objects, e.g., corresponding angles of similar triangles have the same measure and the ratios of the corresponding sides are equal. d. Distinguish between lines, line segments, and rays. e. Describe and draw parallel and intersecting lines, including perpendicular lines. f. Classify angles as acute, obtuse, or right. | Objective 3.2: Specify locations and describe spatial relationships using coordinate geometry. a. Graph ordered pairs of integers on a rectangular coordinate system. b. Identify the coordinates of a point plotted on a rectangular coordinate system. | Objective 3.3: Visualize and identify geometric shapes after applying transformations, and identify lines of symmetry. a. Identify line(s) of symmetry in plane figures. b. Transform geometric shapes using translations (slides), rotations (turns), and reflections (flips). c. Recognize a three-dimensional figure from a net. d. Draw two-dimensional representations of three-dimensional objects. |

| Standard 4: Students will understand and apply measurement tools, formulas, and techniques. | | |
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| <p>Objective 4.1: Understand measurable attributes of objects and the units, systems, and processes of measurement.</p> <ul style="list-style-type: none"> a. Measure a variety of items using both metric and customary units. b. Convert from one unit of measure to another within the same system using unit analysis, e.g., convert 3.5 yards into inches (3.5 yards)(3 feet/1 yard)(12 inches/1 foot). c. Distinguish between direct measurements (length) and derived measurements (area). d. Select and use units of appropriate size and type to describe or identify measurements of angles, perimeter, area, volume, and weight. | <p>Objective 4.2: Determine measurements using appropriate tools and formulas.</p> <ul style="list-style-type: none"> a. Use common benchmarks to select appropriate methods for estimating measurements; e.g., the mass of a paper clip is approximately one gram. b. Measure length, area, volume, and angles to appropriate levels of precision. c. Develop formulas for the area of parallelograms (including rectangles and squares) and triangles. d. Determine perimeters of polygons and circumferences of circles; areas of triangles, parallelograms, and circles; volumes of right rectangular and triangular prisms and cylinders; and surface areas of right rectangular and triangular prisms and cylinders using formulas. | |
| Standard 5: Students will draw conclusions using concepts of probability after collecting, organizing, and analyzing a data set. | | |
| <p>Objective 5.1: Design investigations to reach conclusions using statistical methods to analyze data.</p> <ul style="list-style-type: none"> a. Identify appropriate questions for data collection and then collect, organize, and display responses to the questions. b. Collect, organize, and display data using frequency tables, line plots, bar graphs, circle graphs, line graphs, and stem-and-leaf plots. c. Display the same set of data utilizing two or more different types of representations. d. Compare two similar sets of data using the same type of graph. e. Recognize how changing the scale of the graph influences the appearance of the data. f. Predict basic trends illustrated in a graph. g. Make conjectures (predictions) about the entire population using observations from samples of the population. | <p>Objective 5.2: Apply basic concepts of probability.</p> <ul style="list-style-type: none"> a. Conduct experiments to approximate the probability of simple events. b. Compare individual, small group, and large group results of an experiment. c. Write the results of a probability experiment as a ratio, decimal, or percent. d. Identify the probability of an event as a number between 0 (cannot happen) and 1 (must happen). e. Compute simple probabilities using methods such as lists, tree diagrams, or area models. f. Recognize that the sum of the probabilities of all outcomes of an event is 1. g. Recognize that the sum of the probability of an event and the probability of its complement (not the event) is equal to one. | |